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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/750,402	12/28/2000	Richard M. Formato	47756-CIP1- DIV (70184)	7849

7590

12/02/2002

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EXAMINER

ALEJANDRO, RAYMOND

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 12/02/2002

Restart 3/27/03

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/750,402

Applicant(s)

FORMATO ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 51-123 is/are pending in the application.
- 4a) Of the above claim(s) 77-117 and 120 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 51-53, 57, 59, 60, 62, 69, 72-76, 118, 119 and 121-123 is/are rejected.
- 7) ☒ Claim(s) 54-56, 58, 61, 63-68, 70 and 71 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5-6, 13. 6) ☐ Other: _____

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DETAILED ACTION

Election/Restrictions

1. Applicant's election of Species I (claims 51-76, 118-119 and 121-123) in Paper No. 12 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 51-53, 57, 59-60, 62, 69, 72-76, 118-119 and 121-123 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kindler et al 4865930 in view of Arnold Jr et al 4714663.

The instant application is directed to a method of producing a composite solid polymer electrolyte membrane wherein the inventive concept comprises the specific materials therefor.

With respect to claims 51, 118-119:

Kindler et al disclose the following (claims 1-4):

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40 What is claimed is:

1. A method for forming a membrane comprising gas-permeable regions and ion permeable regions, said method comprising the steps of:

45 (a) providing a substrate comprising a porous ion-impermeable polymer;

(b) fully impregnating said substrate with a chosen polymeric ion-conducting material to provide a composite of regions of said ion-conducting material throughout said substrate;

50 (c) stretching said composite to produce pores in said substrate to provide for the passage of gas and to thereby form said membrane comprising regions of said ion-conducting material juxtaposed to said gas-permeable regions formed by said pores in said
55 substrate.

2. The method of claim 1 wherein said substrate is selected from the group consisting of porous polytetrafluoroethylene, porous polypropylene, and porous polysulfone.

60 3. The method of claim 1 wherein said polymeric ion-conducting material is selected from the group consisting of a cation exchange material, an anion exchange material, and a cation and anion exchange material.

65 4. The method of claim 3 wherein said polymeric ion-conducting material is selected from the group consisting of a polymer of polytetrafluoroethylene with fluorinated ether side chains terminated with sulfonic acid groups, an alkali resistant copolymer of vinyl chlo-

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ride and acrylonitrile with quaternary nitrogen groups, and polyethylene with acrylic acid radiation grafted thereon.

As for claims 52-53, 121-122:

It is further disclosed that the system is particularly useful because of its relatively low operating temperatures i.e. 250°C. Thus, it is noted that the system components are to be thermally stable at temperatures below the above one.

Regarding claims 75-76:

It is taught that alternatively, a solution of the polymer in a chosen solvent may be applied to the surface of the substrate, with subsequent removal of the solvent (col 3, lines 60-64); wherein the solvent is an alcohol blend solvent (col 4, lines 65-68); wherein the membrane was placed in contact with dimethylsulfoxide (col 5, lines 4-8).

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On the subject of claims 72-74:

It is disclosed that the partially wet composite is dipped into a catalyst material, which then becomes attached to the surface of the partially wet composite, upon completion of the drying process, the catalyst material is adhered to the surface of the composite (col 5, lines 60-68). It is noted that by dipping the wet composite into the catalyst material as mentioned above fractions of degraded material is removed therefrom.

Kindler et al disclose a method for forming a membrane according to the foregoing. However, Kindler et al does not expressly disclose the casting process, and the specific substrate and ion-conducting material.

As for claims 51 and 118-119, 123:

Arnold Jr et al disclose a preparation step of a composite membrane including casting the membrane itself (Examples 1-2) wherein the membrane is an oxidative resistant, conductive, ion-selective membrane comprising a catenated aromatic polymer (claim 1); and wherein the membrane comprises a sulfonated aromatic polysulfone (claim 2).

As to claims 57, 59-60, 62:

The membrane is an oxidative resistant, conductive, ion-selective membrane comprising a catenated aromatic polymer (claim 1); and wherein the membrane comprises a sulfonated aromatic polysulfone (claim 2).

With reference to claim 69:

It is disclosed that the aromatic polymers are used either with or without linking groups including polyphenylene or its oxide (col 3, lines 50-54).

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In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to cast the membrane of Kindler et al as taught by Arnold Jr et al as Arnold Jr et al teach that by casting the resin solution a releasable substrate exhibiting an improved area resistivity is obtained.

As for the specific substrate and ion-conducting material, it would have been obvious to one skilled in the art at the time the invention was made to use the specific substrate and ion conducting material of Arnold Jr et al in the membrane of Kindler et al as Arnold Jr et al disclose that for batteries containing strong oxidizing electrolyte and a membrane separating electrolyte solutions, a membrane fabricated from an aromatic polymer and/or a sulfonated polysulfone provides an improved oxidative resistant, conductive, ion selective membrane.

Allowable Subject Matter

4. The following is a statement of reasons for the indication of allowable subject matter: a reasonable search for the prior art failed to reveal or fairly suggest what is instantly claimed, particularly: the specific liquid crystalline polymer substrate comprising a lyotropic liquid crystalline polymer; the specific polysulfone polymer substrate; the fluorinated polyimide polymer; the perfluorovinyl ether sulfonic acid; and the specific ion-conducting material including the specific polymers, chlorinating or brominating composition or antioxidants.

5. Claims 54-56, 58, 61, 63-68 and 70-71 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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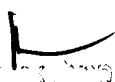
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745



Raymond Alejandro
Examiner
Art Unit 1745